

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON, D. C.

Letter
Circular
LC-466

April 29, 1936

PROCEDURE FOR TESTING WOMEN'S FULL-FASHIONED SILK HOSIERY WITH
THE NATIONAL BUREAU OF STANDARDS HOSIERY TESTING MACHINE.

The recommended procedure for testing women's full-fashioned silk hosiery for "distensibility", "recoverability", and "stretch-endurability" with the National Bureau of Standards hosiery testing machine is given in this letter circular. The machine itself is described in Research Paper RP 679 "Hosiery Testing Machine" (out of print, but can be consulted in libraries where it will be found in Bureau of Standards Journal of Research, Vol. 12, p. 543, May, 1934). The method of laundering preliminary to testing is that outlined in Research Paper RP 753 "Factors Affecting the Performance of Hosiery on the Hosiery Testing Machine" (obtainable from the Government Printing Office, Washington, D. C. for 5 cents). The definitions for "distensibility", "recoverability", and "stretch-endurability" and the minimum values suggested for these characteristics of the hosiery are those recorded in National Bureau of Standards Miscellaneous Publication M 149 "A Basis for a Performance Specification for Women's Full-fashioned Silk Hosiery" (obtainable from the Superintendent of Documents, Government Printing Office for 5 cents).

Laundering procedure

The stocking to be tested is laundered first. It is placed in a one-pint jar containing 200 ml of soap solution at 100° F. The soap solution contains 0.5 percent of "neutral" soap, Federal Specification P-S-566, dissolved in distilled water. The jar is agitated for 30 minutes in a Launder-Ometer in which the jar is attached to a horizontal shaft with the base of the jar toward the shaft two inches from the center of rotation. The shaft is rotated at a speed of 40 to 45 rpm. The temperature is maintained at 100° F by a water bath in which the jar is rotated. The stocking is removed from the jar and rinsed in four changes of water at 100° F. The excess water is removed by centrifuging and the stocking is dried on a hosiery form in a current of air at room temperature. The dried stocking is allowed to come to equilibrium with an atmosphere having a relative humidity of 65 ± 2 percent and a temperature of 70 to 80° F, the standard conditions for textile testing and is tested on the machine in this atmosphere.

Testing procedure

Before the laundered stocking is placed on the jaws for test, the machine is operated for a few cycles and a vertical line is recorded on the chart corresponding to zero load. The machine is then stopped with the distance between the two jaws at a minimum, corresponding to a minimum circumference, that is, distance around the outside of both of them, of 13.3 inches. The stocking is then placed on the jaws and the two garter clasps are attached to opposite sides of the welt midway between the jaws and one inch in from the top edge or selvage. The cord to which the weight of one pound is fastened is attached to the ankle of the stocking two to three inches above the bottom of the heel. The counter is set at zero. The machine is started and the stocking is repeatedly distended to a maximum circumference of 21.3 inches. The load-circumference diagrams produced during the first three cycles of test, are recorded on the chart. The stylus is then lifted from the chart by turning a small cam and the load is transferred from the spring to the support by rotating the disk resting on the support. The machine is not stopped in making these changes. Unless a failure has occurred in the fabric the load is again transferred to the spring at the 200th cycle and the load-circumference diagrams are recorded on the chart during the 200th to 205th cycles at which time the stylus is again lifted from the chart and the load is transferred from the spring to the support. The test is continued until a failure, that is, a hole or run is produced in the stocking. Unless otherwise specified, the test is terminated at 1,000 cycles if failure does not occur before. The "distensibility" and "recoverability", defined below, are then evaluated from the chart with the transparent photographic reproductions of the calibration of the machine.

Definitions and minimum values

"Distensibility" is defined as the ratio of the increase in circumference to the increase in load when the load is increased from 20 to 30 pounds in the first cycle of the test. It is a measure of the ease with which a new, but laundered, stocking can be distended. It should not be less than 0.11 inch per pound, according to Miscellaneous Publication M 149.

"Recoverability" is defined as the circumference of the stocking at a load of 30 pounds in the first cycle expressed as a percentage of the circumference at a load of 10 pounds in the 200th cycle. It is a measure of the ability of the laundered stocking to retain its shape after being repeatedly distended. It should not be less than 96 percent.

"Stretch-endurability" is defined as the number of cycles of the test required to produce a failure, that is, a hole or run in the stocking. It is a measure of the ability of the laundered stocking to resist the development of a hole or run when it is repeatedly distended. It should be not less than 1,000 cycles.